

## **ANNEX A**

# **CONTAMINATION AVOIDANCE PROGRAMS**

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## SECTION 1: PRODUCTION AND FIELDDED ITEMS

### Detectors and Monitors

#### Chemical Agent Monitor (CAM)

The CAM is a hand held instrument capable of detecting, identifying, and providing relative vapor concentration readouts for G and V type nerve agents and H type blister agents. The CAM uses ion mobility spectrometry (IMS) to detect and identify agents within 1 minute of agent exposure. A weak radioactive source ionizes air drawn into the system and the CAM then measures the speed of the ions' movement. Agent identification is based on characteristic ion mobility, and relative concentrations based on the number of ions detected. The three pound, 15" long CAM can be powered either by an internal battery, or by an external source through the CAM's combination power/fault diagnosis plug. The CAM may be used for a variety of missions, to include area reconnaissance and area surveillance, and monitoring of decontamination operations.

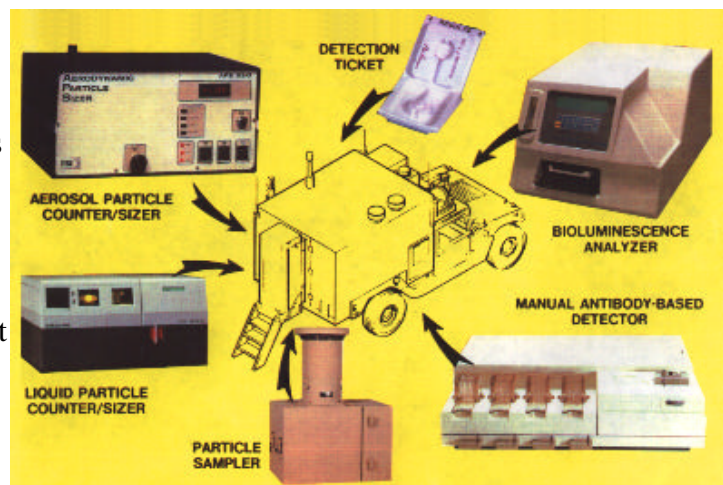


#### Improved Chemical Agent Monitor (ICAM) - Production

The improved CAM (ICAM) significantly reduces the level and frequency of maintenance without effecting the CAM's performance. The ICAM sieve pack has double the capacity of the two CAM sieve packs, which results in twice the operational life of the ICAM over the CAM.

#### M31 Biological Integrated Detection System (BIDS) NDI

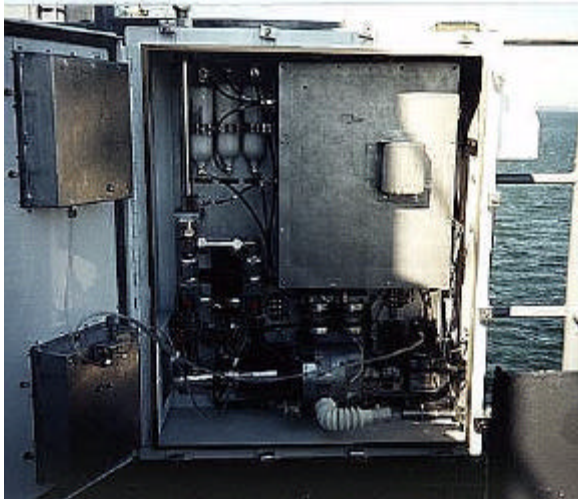
BIDS uses a multiple technology approach, both developmental and off-the-shelf materiel, to detect biological agents with maximum accuracy. BIDS is a vehicle-mounted, fully integrated biological detection system. The system, which is a collectively-protected, HMMWV-mounted S788 shelter, is modular to allow component replacement and exploitation of "leap ahead" technologies. Thirty-eight BIDS (NDI versions) have been fielded to the first ever biological detection company, the



310th Chemical Company (U.S. Reserve) during FY96. This gives the Department of Defense its first credible, rapidly deployable biological detection capability. The BIDS is a Corps level asset. The BIDS program includes a P<sup>3</sup>I research and development effort which will integrate the CB Mass Spectrometer (CBMS) with the Biological Detector as sub-components. Each sub-

component may also be used as stand-alone systems to meet other service needs.

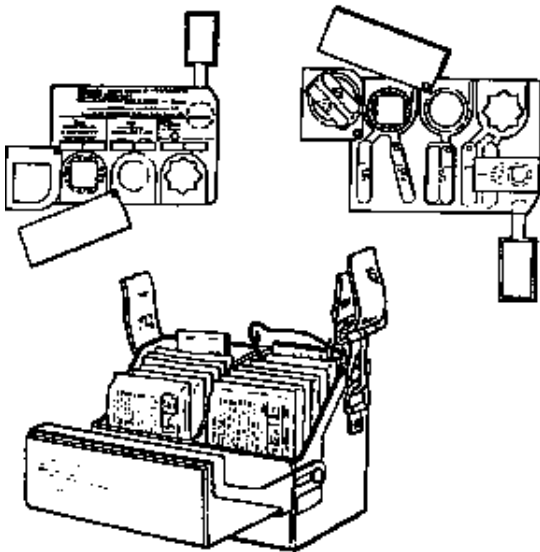
### **Interim Biological Agent Detector (IBAD) -Rapid Prototype**



IBAD provides a near term solution to a deficiency in shipboard detection of biological warfare agents. IBAD consists of a particle sizer/counter, particle wet cyclone sampler and hand held immunochemical, colorimetric assay tickets for identification of suspect aerosol particles (flow through assay). The IBAD is capable of detecting a change in background, which may indicate a man-made biological attack is underway, and sampling the air for identification analysis. The IBAD can detect a change in background within 15 minutes, and can identify biological agents within an additional 30 minutes. It is a rapid prototype system that started service with the fleet

in FY96. Fielding will continue through the first part of FY97. A total of 25 IBAD devices are being fielded. A design based on the basic IBAD system has been chosen as the sensor piece of the Airbase/Port Biological Detection Advanced Concept Technology Demonstration (ACTD).

### **M256A1 Chemical Agent Detector Kit**



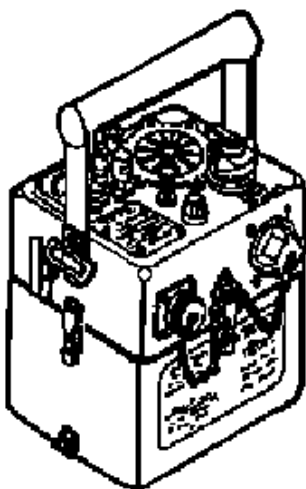
The M256A1 kit can detect and identify field concentrations of nerve agents (sarin, tabun, soman and VX), blister agents (mustard, phosgene oxime, and lewisite), and blood agents (hydrogen cyanide and cyanogen chloride) in about 15–20 minutes. The kit consists of a carrying case containing 12 individually wrapped detector tickets, a book of M8 chemical agent detector paper, and a set of instructions. Each detector ticket has pretreated test spots and glass ampoules containing chemical reagents. In use, the glass ampoules are crushed to release a reagent, which runs down pre-formed channels to the appropriate test spots. The presence or absence of chemical agents is indicated through specific color changes on the test spots. The kit may be used to determine when it is safe to unmask, to locate and

identify chemical hazards (reconnaissance), and to monitor decontamination effectiveness.

## ABC-M8 VGH, AND M9 Chemical Agent Detector Paper

M8 and M9 paper are dye impregnated papers that change color when exposed to liquid chemical agent. These papers cannot detect chemical agents in vapor form. M8 paper comes in 4" by 2 1/2" booklets. Each booklet contains 25 sheets of detector paper that are capable of detecting G series nerve agents (sarin, tabun, soman), V type nerve agents, and H (mustard) type blister agents. M8 paper can identify agents through distinctive color changes from its original off-white: yellow-orange for G, blue-green for V, and red for H. M8 paper is typically used to identify unknown liquid droplets during chemical reconnaissance/surveillance missions. M9 paper is issued as a 33 foot long, adhesive backed strip that is rolled into a 3" 2 1/3" roll. M9 paper can detect G and V nerve agents, and H and L (lewisite) blister agents. It cannot distinguish the identity of agents. It turns red, red-purple, or red-brown when in contact with liquid chemical nerve and blister agents. M9 paper is typically placed on the BDO, equipment, and vehicle exteriors to warn personnel of the presence of a liquid chemical agent.

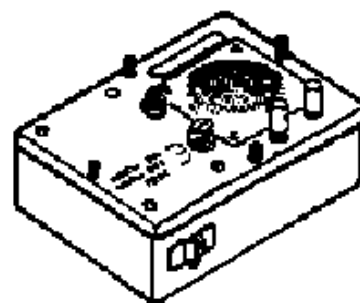
### M8A1 Automatic Chemical Agent Alarm (ACAA)



**M43A1 Detector Unit**

The M8A1 ACAA is a system that continuously samples the air to detect the presence of dangerous concentrations of G and V type nerve agent vapors. The M8A1 ACAA may be employed in a number of configurations, but all configurations are built around the M43A1 detector unit, and the M42 alarm unit. The configurations differ primarily in their mountings and power supplies: ground mounted and battery operated, or mounted on a vehicle and powered by the vehicle's electrical system. The M43A1 detector unit measures 6 1/2" x 5 1/2" x 11" with the battery used in ground mounted operations adding another 7 3/4" in height. The M43A1 detector unit uses a radio-isotope to ionize molecules in the air that is pumped through the system, and detects electrical current changes that occur in the presence of nerve agents.

The M43A1 detector unit will alarm within about 1-2 minutes from exposure to agent. The M42 alarm unit is a remote visual and audible alarm that measures 7" x 4" x 2 1/3". The M42 alarm unit may be placed up to 400 meters from the M43A1 detector unit to give users warning of an approaching agent cloud.



**M42 Alarm**

### M-90 Automatic Agent Detector (AMAD)

The AMAD is an automatic nerve and mustard (HD) agent detector which detects agent in vapor form. This system is currently in use by the Air Force. It transmits an alarm by radio to a central alarm unit.

### **Automatic Liquid Agent Alarm (ALAD)**

The ALAD is a liquid agent detector which can detect droplets of GD, VX, HD, and L as well as thickened agents. It transmits its alarm by radio to a central alarm unit. Although the remote transmission is useful, the device only detects droplets of liquid agent. It must be used in conjunction with other point and/or stand-off vapor agent detectors to afford a complete detection capability.

### **Chemical Agent Point Detection System (CAPDS), MK21, MOD1**

This is a fixed system capable of detecting nerve agents in vapor form, using a simple baffle tube ionization spectrometer. Installed in a ship's upper superstructure level, CAPDS obtains a sample of external air, ionizes airborne vapor molecules, and collects them on a charged plate after eliminating lighter molecules via the baffle structure. When a sufficient mass of ions is collected, a pre-set potential is achieved, and an alarm signal is generated and sent to both Damage Control Central and the bridge. The system has been installed on essentially all surface ships.

### **Improved (Chemical Agent) Point Detection System (IPDS) - Production**

The IPDS is a new shipboard point detector and alarm that replaces the existing shipboard CAPDS. IPDS uses special elongated ion mobility cells to achieve the resolution necessary to counter false alarms caused by interferent vapors. IPDS can detect nerve and blister agents at low levels, and automatically provide an alarm to the ship. The unit is built to survive the harsh sea environment and the extreme electromagnetic effects of a Navy ship.

## **Stand-off Detection and Remote/Early Warning**

### **AN/KAS-1 Chemical Warfare Directional Detector (CWDD)**

This is a semi-portable system designed to detect nerve agent vapor clouds at ranges up to 5 kilometers. The AN/KAS-1 must be removed from its stowage case and set up on a pre-installed pedestal for operation. Because the detector provides information for analysis of the infrared light emission characteristics of distant, manually acquired vapor clouds, it requires a trained, diligent operator to be effective. A new version of this system includes a remote video display providing enhanced capability for vapor cloud analysis, and a remote relative bearing indicator useful in guiding the ship to a man overboard or other surface target with a thermal signature.





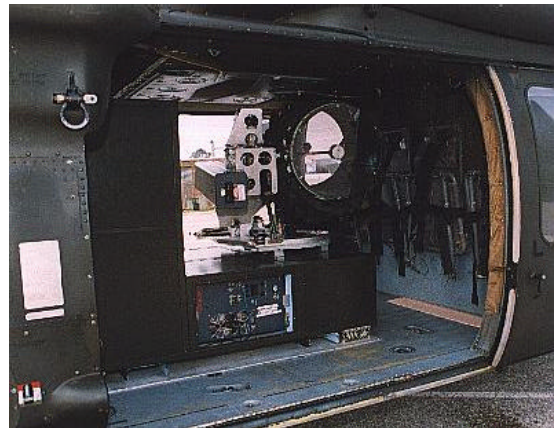
### **M21 Remote Sensing Chemical Agent Alarm (RSCAAL)**

The M21 RSCAAL is an automatic scanning, passive infrared sensor that detects nerve and blister agent vapor clouds based on changes on the infrared spectrum caused by the agent cloud. It is effective at line-of-sight distances of up to five kilometers. The alarm is used for surveillance and reconnaissance missions in both vehicle-mounted and tripod-mounted modes.



### **Long Range Biological Stand-off Detector System (LRBSDS) - NDI**

LRBSDS utilizes infrared light detection and ranging (IR-LIDAR) technology to detect, range and track aerosol clouds that are indicative of a BW attack; the LR-BSDS cannot discriminate biological from non-biological clouds. The system, which is approximately 800 pounds and three cubic meters, has three major components: a pulsed laser transmitter operating at infrared wavelengths; a receiver and telescope; and an information processor and display. This program, like the BIDS, has been designed in two phases; a NDI phase designed to rapidly field an interim capability, and a pre-planned product improvement (P3I) phase.



The three NDI LR-BSDSs are already being fielded to their owning unit, the newly activated BIDS company (310<sup>th</sup> Chemical Company (USAR)). The NDI system is able to detect and track man-made aerosols out to 30 km, but is non-eyesafe out to about 5 km.

## **NBC Reconnaissance**

### **XM93 NBC Reconnaissance System (NBCRS)**

The XM93 is a dedicated system for NBC detection, warning, and sampling equipment integrated into a high speed, high mobility armored carrier capable of performing NBC reconnaissance on primary, secondary, or cross-country routes throughout the battlefield. The XM93 can find and mark chemical and nuclear contamination. Through a secure communications system, it provides warnings to follow-on forces. The crew is protected by an on-board overpressure system.

## **M93A1 NBC Reconnaissance System (NBCRS) - Production**



The M93A1 is a system improvement phase (SIP) to upgrade the XM93 to detect chemical contamination vapors within 5 km using the M21 RSCAAL stand-off detector. It will automatically integrate contamination information from sensors with input from on-board navigation and meteorological systems. It rapidly transmits hazard warning via a central data processor and integrated digital jam-resistant communications. The M93A1 central data processing and manprint changes permit reducing the crew from four to three individuals. For

the first time, this program also develops and fields organic supply and maintenance for the FOX NBCRS.

### **Radiacs**

#### **AN/VDR-2**

The AN/VDR-2 measures gamma dose rates from 0.01  $\mu\text{Gy/hr}$  (micro-Grays per hour) to 100  $\mu\text{Gy/hr}$  and beta dose rates from 0.01  $\mu\text{Gy/hr}$  to 5  $\mu\text{Gy/hr}$ . The unit functions simultaneously as a dose rate meter and dose meter with independent adjustable alarms that can be set at any level over the entire range. Dosage data is independently stored in non-destructive memory for display on command and may be retained when the unit is turned off. The unit is powered by three 9 volt batteries.

#### **AN/PDR-77 Radiac Set**

The AN/PDR-77 Radiac Set is a set of portable radiation detection equipment for detecting alpha, beta/gamma, and x-ray radiation. The set consists of a radiacmeter to which one of three radiation probes can be attached for measuring particular types of radiation. The probes are part of the set. The set includes accessories and basic test and repair parts for unit maintenance including a carrying pouch with shoulder straps capable of holding the radiacmeter, alpha probe and beta/gamma probe for field use. The entire set is contained in a carrying case (large briefcase) for easy portability and storage.

#### **AN/UDR-13 Pocket RADIAC (Platoon Radiac) - Production (FUE FY98)**

The AN/UDR-13 Pocket RADIAC is a compact, hand-held, tactical device capable of measuring the gamma dose-rate and gamma/neutron cumulative dose in a battlefield environment.



Its pocket size permits convenient use by troops on foot. Alarm pre-sets are provided for both the dose-rate and total dose modes. A push-button pad enables mode selection and functional control. Data readout is by liquid crystal display. It will replace the obsolete IM-93 quartz fiber dosimeter.

### **Multi-Function Radiation (MFR) Detector -Production**

This program will develop improved radiation detection equipment to replace the current suite of logistically unsupportable assets. Present detectors (PAC-1S, AN/PDR-43 and AN/PDR-56F) have exceeded maintainability standards. Original manufacturers have either discontinued production or are no longer in business. An improved capability is required to support both wartime and peacetime nuclear accident response operations. A production contract was awarded in March 1995. First deliveries are expected in March 1997.

### **ADM-300A Multifunction Survey Meter**

The ADM300A is a battery-operated, self-diagnostic, multiple functional instrument. It is used alone to locate and measure low and high intensity radioactivity in the form of gamma rays or beta particles. It is used with external probes to locate and measure alpha, beta, gamma, and x-rays, and neutron radiation.

## SECTION 2. RDTE ITEMS

### Automatic Detectors and Monitors

#### XM22 Automatic Chemical Agent Detector and Alarm (ACADA)

ACADA is a man-portable, point sampling alarm system that provides significant improvement over current capabilities; it detects, and identifies all nerve agents, mustard, and lewisite, by class. ACADA provides concurrent nerve and blister agent detection, improved sensitivity and response time, agent identification capability, improved interference rejection, extensive built-in test, a data communications interface, and the capability to be programmed for new threat agents. It replaces the M8A1 Alarm as an automatic point detector and augments the CAM as a survey instrument. The ACADA consists of an off-the-shelf non-developmental item (NDI), the GID-3 chemical agent alarm.

#### Agent Water Monitors

*The Agent Water Monitor is a cooperative RDTE effort, chartered to develop a detection system which will detect chemical and biological agents in water. The detector will feature multi-agent capabilities, and operate automatically, improving both ease and response time of existing system. The project will accommodate the four services' requirements for the following:*

**In-line CB Detector (IL CBDWS)**  
**Chemical Agent Water Monitor (CAWM)**  
**CB Agent Water Monitor (CBAWM)**

#### Rationale:

Army, Air Force, Marine Corps (Requirement)  
Navy (Interest)

#### Key Requirements:

- Detect and identify chemical agents and agents of biological origin in water
- Perform monitoring automatically with continuous and batch sampling capabilities
- Easy to operate and support in forward areas, austere environments, and limited lighting

#### Description:

The Agent Water system will improve current water monitoring and purifying capabilities. It will automatically detect CB agents at or below harmful levels in water and not false alarm to common interferents. The system will be compact, man-portable and easy to use, and be decontaminated to a negligible risk level.

## Joint Chemical Agent Detector (JCAD)

*The JCAD is a fully cooperative RDTE effort, chartered to develop a chemical agent detector for a variety of mission requirements and service platforms. The detector will provide warfighters near-real time information on the presence of chemical agents so that meiosis or more severe effects can be avoided and not subvert the mission. The project will accommodate the four services' requirements for the following:*

***Individual Soldier Detector (ISD)***  
***Special Operation Force Chemical Agent Detector (SOFCAS)***  
***Individual Vapor Detector (IVD)***  
***Aircraft Interior Detector (AIDET)***  
***Shipboard Chemical Agent Monitor Portable (SCAMP)***  
***CW Interior Compartment System (CWICS)***  
***Improved Chemical Detection System (ICDS)***

### Rationale:

Army, Navy, Air Force, Marine Corps (Requirement)

### Key Requirements:

- Small, lightweight detector capable of detecting presence of chemical agent vapors
- Capable of de-warning, allowing for rapid reduction of protective postures
- Detect, identify, quantify and warn of presence of even low levels of nerve or blister agents in vapor form in aircraft and shipboard interiors
- Operated/maintained by ship's force; operate in a shipboard environment

### Description:

The JCAD will consist of: 1) a small lightweight device to be worn by individual personnel to warn them of a chemical agent attack; 2) a system that will detect, identify, quantify and warn of the presence of nerve agents and blister agents in vapor form in aircraft interiors; 3) a portable monitor, capable of detecting nerve agents and blister agents on personnel and in compartments, free of false alarms.

## Biological Point Detection

*Biological Point Detection is a fully cooperative acquisition effort chartered to develop new biological point detectors and detection systems for quad-services. The BIDS P3I effort will encompass development of an integrated system as well as several stand-alone biological detectors:*

*In addition, a Joint Biological Point Detection System (JBPDS) is under development. JBPDS will be a system that can stand alone, or be used in a suite of systems.*

### Biological Integrated Detection System (BIDS) -P3I

#### Rationale:

Army (Requirement)

Navy, Air Force, Marine Corps (Interest in BIDS' sub-components)

#### Key Requirements:

- Detect and identify 5 to 25 agent-containing particles/liter of air (ACPLA) in the 2–10 micron range in 15–30 minutes
- Provide agent detection and identification
- Provide collective protection with environmental controls (BIDS)
- Knowledge-based system to process detector information (BIDS)
- FM/HF radios to communicate (BIDS)
- Automatically identify biological pathogens and toxins (BD)
- Detect aerosol samples of specified materials (CAT A of ITF-6 Report) (BIDS)
- Reject common battlefield interferents and re-programmable to detect new agents (BD)
- Be data-linked with a centralized hazard information data collection center (BD)
- Characterize new agents; detect, identify, and semi-quantitative CB agents (CBMS)
- Respond to agent vapors, aerosols or liquid droplets (CBMS)
- Have chemical detection thresholds at or below human response levels (CBMS)
- Possess modules to accommodate future advances in technology and CB threat (CBMS)

#### Description:

BIDS uses a multiple technology approach, both developmental and off-the-shelf materiel, to detect biological agents with maximum accuracy. The BIDS P<sup>3</sup>I system will integrate the CB Mass Spectrometer (CBMS) and the Biological Detector (BD) as sub-components.

The biodetector is an antibody based, device capable of identifying specific biological agents. It consists of electronics processing equipment, fluid processing modules, reservoirs for antibody reagents, and a light addressable potentiometric sensor to provide

biological agent identification. The total processing time, from insertion of sample to data readout, will be approximately 15 minutes at threshold concentrations. The biodetector includes an operator display which will provide identification and relative concentration of the biological agent detected. Built-in tests will also be provided to identify system malfunctions.

The CBMS detects and characterizes all known chemical and biological threat agents. It continuously and automatically detects threat agents via a mass analyzer chassis, a biological aerosol sampling probe, a surface sampling probe and sample identification device. The mass analyzer chassis houses the mass analyzer, pumps, control electronics, and computers. With the aerosol probe attached, the CBMS detects biological agent aerosols and chemical agents as aerosols and/or vapors in the air. With the ground probe attached, the CBMS detects chemical agents whether they exist as airborne vapors or aerosols, or as liquid droplets on surfaces. The CBMS will replace the MM1 and be mounted within the NBC Recon System to search for areas of CB agent contamination.

### **Air Base/Port Biological Detection Advanced Concept Technology Demonstration (ACTD)**

#### **Rationale:**

Requirements identified by the Commander-in-Chief Central Command (CINCCENT) and Commander-in-Chief Pacific Command (CINCPAC)

#### **Key Requirements:**

- Field an interim system to sponsoring CINCs that provides rapid, automated biological attack detection and warning (5 to 10 minutes) to high value fixed sites (*e.g.*, ports and airfields)
- In addition to the biological detection system itself, provide the following “leave-behinds” or “residuals” to the fixed sites: an integrated command and control system to assist base personnel in rapid assessment, warning and dissemination of attack data; oral-nasal respirators for protection from any re-aerosolized agents after an attack, unmasking procedures; operational procedures
- Demonstrate candidate technologies and operational concepts that may both fill the CINCs immediate needs, and provide valuable “lessons learned” for future systems

#### **Description:**

While the BIDS and Long Range Biological Detection System (LR-BSDS) programs have made significant advances towards mitigating the effects of the worst case biological attack scenario (long line source releases – *e.g.*, an aircraft spraying agent along a course tens of kilometers long), it has been recognized that we still have potential vulnerabilities in protecting those high value fixed sites that will play critical roles in our force projection operations. Ports and airbases, by nature of their commonly known locations and high density of personnel, make lucrative targets for point source releases (*e.g.*, theater ballistic missiles, covert spraying by land and sea vehicles, or even man-portable disseminators). JPO-BD proposed taking available technologies, and through the non-standard acquisition process called ACTD, provide a limited number of detection systems to warfighting

CINCs. The concept has been to build an intelligent network of sensors based on the Navy's IBAD, but add to each sensor a generic biological detector module, location and meteorology modules. The detector network is able to both detect in near real time significant changes in background aerosol concentrations, but can also (less than 10 minutes) tell the operator located in the central command post (CP) whether the aerosol is composed of likely BW agents. Site personnel are then able to retrieve samples of the aerosol from the sensors for confirmatory identification of the BW agent. The ACTD will not only provide the detection and identification hardware and procedures, it will also provide leave-behinds for post attack actions, such as: inexpensive and light weight oral-nasal respirators to protect personnel from re-aerosolized BW agents but without all the stresses associated with full face respirators; decision aids and procedures for site decontamination; and procedures for determining when it's safe to remove protective gear. Testing of small scale detector network prototypes is underway; full scale testing of an entire network and other leave behinds will be done this Summer. Full scale deployment of the ACTD to CENTCOM and PACOM will begin in FY98.

### **Joint Biological Point Detection System (JBPDS)**

#### **Rationale:**

Army, Navy, Marine Corps and Air Force (Requirement)

#### **Key Requirements:**

- Automatically detect, identify and warn of the presence of aerosolized biological warfare agents at levels of sensitivity, speed and reliability equal to or better than currently fielded detection systems (to include the BIDS P3I)
- Provide a common suite of biological detection equipment that can be applied to all four services' designated platforms
- Provide a man-portable version (Marine Corps)
- Be operable while on the move (Navy and Air Force)

#### **Description:**

JBPDS is the developmental system that will replace all existing NDI systems (BIDS, IBAD and Air Base/Port ACTD), and provide biological detection capabilities throughout the services, and throughout the battlespace. The common biological detection suite will consist of four functionalities: trigger (detects a significant change in the ambient aerosol in real time), collector (collects samples of the suspect aerosol for analysis by the JBPDS, and for analysis by supporting laboratories in the Communications Zone (COMMZ) and CONUS), detector (able to broadly categorize the contents of the aerosol and lend confidence to the detection process; *e.g.*, biological material in the aerosol or not, bacteriological, spore, protein, *etc.*), and identification (provides presumptive identification of the suspect BW agent and increases confidence in the detection process). These four functionalities will be integrated to allow fully automatic operation, and warning of a positive BW detection. The JBPDS program consists of two phases (Block I and Block II) to allow fastest possible fielding of a joint biological detection system, while at the same time preparing to take advantage of the rapid advances taking place in the



biological, information processing and engineering sciences. JPO-BD will award an Engineering and Manufacturing Development (EMD) contract this year for the development of Block I JBPDS prototypes for all four services. Production is anticipated to start in FY00, with first unit equipped in September, 2001. This joint acquisition strategy will allow for significant economies throughout the RDA process by eliminating duplicative efforts among the services, and greater logistic supportability in joint operations as each service will be able to support the other services' JBPDSs.

### **Shipboard Automatic Liquid Agent Detector (SALAD)**

**Rationale:**

Navy (Service-Unique Requirement)

**Key Requirements:**

- Automatic detection of liquid chemical agents
- Operated/maintained by ship's force
- Operate in a shipboard environment and detect while the ship is underway

**Description:**

SALAD is an exterior, liquid agent point detection and monitoring system that will detect and alarm in the presence of liquid nerve and blister agents. SALAD will consist of a detector unit that uses chemically treated paper, optical scanners, a central processing unit and alarms (visual and audible) on the bridge and Damage Control Central.

### **Stand-Off Detection and Remote/Early Warning**

#### **Joint Service Lightweight Stand-off Chemical Agent Detector (JSLSCAD)**

*The JSLSCAD is a fully coordinated joint service RDTE program, chartered to develop a lightweight stand-off chemical detector for the quad-services. The JSLSCAD will utilize a passive infrared sensor with 360° scanning to satisfy requirements for:*

***Lightweight Stand-off Chemical Agent Detector (LSCAD)***

***M21 Moving Background***

***Chemical Agent Remote Detection System (CARDS)***

***Stand-off Detector for Armored System Modernization (SD/ASM)***

**Rationale:**

Army, Navy, Air Force, Marine Corps (Requirement)

**Key Requirements:**

- Automatically detect nerve or blister agents at a distance up to 5 km

- Be lightweight and employed from manned and unmanned systems
- Be capable of being data-linked with centralized hazard information data collection center
- Be capable of remote operations; aerial and on-the-move operation

Description:



**JSLSCAD Mounted on Vehicle**

The JSLSCAD will be capable of scanning 360° x 60°, and automatically detecting nerve or blister agents at a distance up to 5 km. The system will be light, compact and operate from a stationary position or on-the-move. The JSLSCAD Michelson interferometer employs a passive infrared system that will detect presence of chemical agents by completing a spectral analysis of target vapor agent chemical clouds.

**Joint Service Chemical Warning and Identification LIDAR (JSCWILD)**

*The JSCWILD is a fully coordinated joint service program, chartered to develop a chemical warning and identification system for the quad-services. The JSCWILD will utilize an active LIDAR sensor to perform rapid agent identification and ranging to satisfy requirement for:*

***Laser Stand-Off Chemical Detector (LSCD)***  
***Area Detection System (ADS)***  
***Stand-off Detector (SD)***  
***CB Stand-off Detector (CBSD)***

Rationale:

Army, Air Force (Requirement)

Key Requirements:

- Automatically detect, range, and map CW agents at distances of up to 20 km
- Scan atmosphere and terrain to detect chemical vapors and airborne liquids and particles
- Provide stand-off capability for both fixed site and reconnaissance
- Provide rapid agent concentration mapping

Description:

The JSCWILD will be a lightweight, vehicle-mountable, contamination monitoring system which detects and quantifies, from a distance of 20 kilometers, all types of chemical agent contamination (including agent rain, vapors, and aerosols), in a stand-off mode. The JSCWILD will operate from fixed sites and ground vehicles. The system has distance-ranging and contamination-mapping capabilities and transmits this information to a battlefield information network.

**Biological Remote/Early Warning**

*The Army's Long Range Biological Standoff Detection System (LR-BSDS) is a legacy system that is being incorporated into what is envisioned to be a family of early warning systems*

*The Joint Biological Remote Early Warning System (JBREWS) program is intended to give the warfighting commander a significantly shortened decision cycle regarding biological attacks; that is, the commander will see and be able to react to a biological attack much faster, thereby allowing many more personnel to take protective measures before they become exposed to the biological warfare agents. This means that fewer people will become casualties, and fewer people will have to take post-attack medical treatments.*

**Long Range Biological Standoff Detection System (LR-BSDS) P3I**

Rationale:

Army (Requirement)  
Air Force, Navy (Interest)

Key Requirements:

- Stand-off detection of aerosol clouds to a range of 50 km
- Provides relative concentration, range, location, and tracking of suspect aerosol clouds
- UH-60 helicopter-mounted

Description:

LRBSDS uses infrared light detection and ranging (IR-LIDAR) technology to detect, range and track aerosol clouds that are indicative of a BW attack; the LR-BSDS cannot discriminate biological from non-biological clouds. The system, which is approximately 800 pounds and three cubic meters, has three major components: a pulsed IR laser transmitter operating at infrared wavelengths; a receiver and telescope; and an information processor and display. This program, like the BIDS, has been designed in two phases; a NDI phase designed to rapidly field an interim capability, and a pre-planned product improvement (P3I) phase. The three NDI LR-BSDSs are already being fielded to their owning unit, the newly activated BIDS company (310<sup>th</sup> Chemical Company (USAR)). The NDI system is able to detect and track man-made aerosols out to 30 km, but is non-eyesafe out to about 5 km. The P3I LR-BSDS will be eyesafe, will have a longer

operating range, and will be easier to operate. Three NDI LR-BSDSs have been fielded to the 310<sup>th</sup> Chemical Company. The first P3I LR-BSDSs will be fielded in time for the second BIDS company's activation in FY99.

*The Joint Program Office for Biological Defense is leveraging the benefits of the ACTD program to greatly accelerate the development of the next generation of remote/early warning systems (i.e., systems other than the LR-BSDS). This new generation of detectors is referred to as the Joint Biological Remote/Early Warning System (JBREWS). JPO-BD is managing a JBREWS ACTD that will both address selected CINCs' needs, and will better refine our requirements and concepts regarding remote/early warning systems.*

### **Joint Biological Remote/Early Warning System (JBREWS)**

#### **Rationale:**

CENTCOM, EUCOM requirement (ACTD)

All services interest (ACTD and objective system)

#### **Key Requirements:**

- JPO-BD is currently sponsoring a series of concept studies with the Institute for Defense Analysis (IDA), and a Study Advisory Group (SAG) composed of CINC, service, and Joint NBC Defense Board representatives. This cooperative effort will define the requirements for the JBREWS ACTD
- The ACTD will formally start in FY98, with fielding of ACTD systems to selected CINCs around FY01
- Lessons learned from the JBREWS ACTD will assist the SAG in developing/refining its requirements document for the JBREWS objective system
- JBREWS objective system is expected to start fielding around FY03

#### **Description:**

JBREWS is expected to evolve into a "system of systems". That is, we will likely have standoff LIDAR systems like the LR-BSDS, and fairly dense arrays of miniaturized, rugged point detectors that possess only one or two of the functionalities that the much more robust JBPDS will have. The point detectors may be employed in a variety of ways: carried on vehicles, emplaced by hand around unit/site perimeters, remotely emplaced by aircraft, or possibly even delivered by artillery or rocket systems to project the sensors into contested or enemy controlled areas. What is becoming clearly evident from our studies is that the systems need to be networked together to provide the greatest confidence of accurate detection and fastest warning, and that they need to be employed in fairly high numbers to ensure point releases are not missed.

## NBC Reconnaissance

### Joint Service NBC Reconnaissance System (JSNBCRS)

*The Joint Service NBC Reconnaissance program is a coordinated Army and Marine Corps effort and will yield improved reconnaissance capabilities for both heavy and lightweight vehicle platforms. It will satisfy requirements for:*

***M93A1 NBC Reconnaissance System (NBCRS)  
System Improvement Phase (SIP) - Production  
Light NBC Reconnaissance System (LNBCRS)  
Lightweight Reconnaissance System (LWRS)***

#### Rationale:

Army, Marine Corps (Requirement)

#### Key Requirements:

- Armored vehicle with over-pressure collective protection and macro cooling
- Chemical agent stand-off and point detectors and monitors
- Radiation detector and monitor
- Integrate central data processor with all detectors and monitors; navigation and communications system; jam resistant communications system; meteorological sensing system
- Integration of advance NBC detection and analysis equipment suited for Marine Air-Ground Task Force (MAGTF) operations (LNBCRS)
- Standard Marine Corps host vehicle, transportable by C-130, CH-53E, and LCAV-30 (LNBCRS)

#### Description:

The LNBCRS will provide a premiere vehicle for accurate, rapid NBC combat hazard information by verifying the absence of, finding, mapping, and marking radiological, biological, and chemical hazards. The LNBCRS will be an integration of advanced NBC detection and analysis equipment suited for Marine Air-Ground Team Force expeditionary operations and Army rapid deployment/light operations.

## **Warning and Reporting**

### **Joint Service Warning and Reporting Network (JWARN) (FUE FY 99)**

#### **Rationale:**

Army, Air Force, Navy and Marine Corps (Requirement)

#### **Key Requirements:**

- Capable of interfacing with all NBC detectors and sensors
- Capable of interoperability with all service command and control systems
- Capable of generating NBC reports
- Capable of automatic transmission of NBC alarm and data
- Capable of vehicle operation

#### **Description:**

Consolidation of HAZWARN (warning and reporting) with MICAD to form a comprehensive upgradable NBC component to the emerging C<sup>4</sup>I systems in the services. System does not duplicate C<sup>4</sup>I fractures but integrates into the global command and control system to provide automated NBC warning and NBC mission planning function.